Reduction of Waste: A Profile of Success

Lt. Kevin Nalette, SSgt. Chad Pinkerton
341st. Transportation Sq.
107 77th St. N.
Malmstrom AFB, MT. 59402-7540
E-mail: pinkertc@malmstrom.af.mil
Tel (406)731-6344
Fax (406)731-6261

The 341 Transportation Squadron is continually searching for new ways to prevent pollution and reduce waste. Our biggest project to date has been the upgrading of the Allied Trades facility. The current facility has been in use since the early 1960's. Though this building was originally designed to be used by Boeing Corporation as a vehicle service station, some 30 years ago it was turned into an Allied Trades Shop for Malmstrom AFB. Obviously, this building was never designed for this purpose, and has been a poor substitute at best. In this time of down sizing, outsourcing, and base closures we decided to take a look at our building and our processes, we weren't impressed. We found numerous areas for improvement both environmentally and in element organization. After the eye-opening look we took at ourselves we put numerous initiatives into motion that will both improve our organization and lessen the impact that we have on the environment. One of these initiatives is a major facility renovation, due to be completed in mid 99, in addition we have purchased new equipment that will greatly enhance the element's work organization and ensure environmental compliance into the foreseeable future. A systems approach to incorporate state of the art technology has resulted in a 70% reduction in hazardous waste streams in this element. We are committed to providing the best equipment for our people and making it a priority to purchase equipment that reduces waste and is environmentally friendly. In order to get the full understanding of what we have been able to do, we will outline our improvements step-by-step.

The first item we will cover is the new paint guns we have acquired. They are the Sata jet HVLP(high volume low pressure) model B-NR 95. To get a full understanding of the improvements that this product has given us, we will discuss our old model's performance versus our new model. Our old paint guns were of the conventional siphon feed type, none of which were very efficient. These siphon feed type guns only have about a 35% transfer efficiency rate which led to large amounts of over spray and wasted paint. These types of paint guns utilize medium to high air pressure to atomize the paint once it leaves the spray tip, this creates excessive amounts of over spray. As an example, if 55 psi of air goes into the gun, the paint exits the gun and is atomized at 55 psi, resulting in low efficiency and over spray. Due to its 35% transfer efficiency(65% inefficiency), it takes as much as two times the paint to cover the same surface area as is

required with the Sata jet. With this poor transfer rate, significant amounts of over spray are released into the environment. While this is not the only reason for our over spray problem, it was a large part, other factors will be discussed later. The new Sata-jet paint guns have greatly improved the painting operations. These guns are of the gravity-fed HVLP type, which helps in several areas. For example, for every 10 psi that goes into the gun, 1 psi comes out. This alone greatly reduces the over spray, raising the transfer efficiency from 35% to 80%. The gravity fed design of the Sata jet gun allows for virtually all paint in the gun to be used, this reduces waste paint and greatly reduces clean up time. The HVLP design of the gun allows the paint to be atomized with far less air pressure. While the HVLP gun is a more technically advanced gun, the clean up of this particular model is far easier than that of a conventional gun. The paint cup is made of stainless steel which eases washing, there is no pick up tube to be cleaned, and because it is gravity fed, paint thinner can be cycled through the gun without any air pressure. This eliminates paint thinner being blown into the air, which reduces both worker and environmental exposure.

With new paint guns came the need for a better way to clean them without creating more of a waste stream and, possibly reducing it. This led to the purchase of the Herkules Paint Gun Washer and Recycler. This system allows us to do several things. First, it eliminates worker exposure to the solvents during cleaning operations. Second, it is self-contained, which reduces the amount of vapors released into the environment, while virtually eliminating the chance for a waste spill. The self contained design of the Herkules gun cleaner allows for less thinner to be used, as all thinner is re-circulated. This re-circulated thinner is used until it becomes too contaminated to clean effectively. This in itself has provided savings in both money and waste. The Herkules also has a larger capacity, this allows two guns to be cleaned at once. Our old system was one provided by a government contract. It required the workers to physically wash their guns as a stream of solvent was run across them. This put the workers in direct physical contact with the solvent, and within close proximity to the solvent fumes. The contractors system had to be vented, this released solvent vapors directly into the environment. With the old system, the contractor changed solvents approximately every 6 weeks, this resulted in at least 5 gallons of waste per visit. Since implementing the use of the of the new cleaner 12 weeks ago, we have yet to dispose of any thinner as waste. The Herkules system has also saved us money on the purchase of paint thinner, due to the fact we use shop recycled thinner as it's sole cleaning solvent. With the Herkules paint gun cleaner there was a one time start up fee of $35, and no waste produced. This is compared to the contractors system which has a $1,200 annual cost, and produces approximately 44 gallons of waste a year.

With the purchase of new paint guns and a new gun cleaner, we decided to look at another of our big waste producers, paint. With our old paint system we were using a low solids paint with a VOC (volatile organic compound) content of at least 5.2 pounds per gallon. We determined, through intensive research, that we could do much better. As a result of our research we purchased the PPG Delta Paint Mixing System. This system serves our needs in a variety of ways. First and foremost, it allows us to meet or exceed

some of the most stringent environmental regulations in the nation. Although there are currently no such regulations for VOC output in Montana, a national ruling that would set VOC maximums at 4.9 lb. per gallon is expected in the near future. With our Delta system, which is only 3.5 lb. per gallon, we exceed that level and levels for over 80% of the nation. If it becomes necessary, we can lower our VOC to 2.8 lb. per gallon. Lowering VOC contents to this level would put us in compliance with some of the most stringent regulations in the nation. Since the system uses a high-solids paint, it requires fewer coats to do the same surface area as our old system. High-solids paints are denser, this enables the workers to use half as much paint to cover the same surface area. Though there was a noted increase in the cost of the paint per gallon, by using half as much paint for the job there is not a noticeable end-cost increase, and in some instances there is a substantial decrease. This type of paint has proven to be just as durable and resilient as the previous paint. The clear coat has proven to be much more scratch resistant and has a higher gloss-back image than that of our old clear coat. With the new system we have noticed a marked decrease in paint procurement time, and less mixed paint sitting in stock. These decreases are due to the fact the paint toners are now on hand and readily available. This enables us to mix the paint color that we need in the quantity we need. With our old way of doing business we would need to go downtown, and purchase a minimum of 1 pint of paint, regardless of the size of the job. The left over paint would then be stored in a flammable locker, where it would often become waste. Another drawback to our old system was the wait time for the jobber from downtown to mix and deliver the paint. With this new system, we are able to mix the exact amount of paint we need for each job, as we need it, with no delay. This has virtually eliminated the wasted paint and excessive down time, and in theory gives us exact paint matches for repair work. The one problem we have had with this new system is due to the high solid content of the paints and not having the proper "paint codes" to mix the exact color. This has limited us in some instances where the representative from PPG has had to send a color example to the factory for a custom color blend. Other than the typical growing pains that come with any new process, the new system has halved our waste and improved the painting process in terms of end result. Although the system cost us $12,000 it has almost paid for itself in just over three months. The $12,000 price tag is minute when compared to the potential environmental savings.

Although all of our purchases have improved our way of doing business and reduced the impact we have on the environment, the jewel in our crown is the purchase of the "Recyclit" Thinner Recycler. This unique device virtually eliminates our liquid waste stream. With this system, the used paint thinner is distilled, this leaves clean thinner. This clean thinner can then be used as paint gun cleaning solvent. The small amount of solid waste is easily disposed. Waste can be dealt with in one of two ways, mixed with thinner and used as vehicle undercoating or simply dried and eliminated. A test is underway to determine if this solid waste can be disposed of with the normal trash. This system has been in use in our shop for just over three months, and we have yet to purchase new thinner. The need to purchase new gun cleaning solvent has been eliminated by the use of the Recyclit Thinner Recycler. Since implementing the use of

our new recycler, we have reduced our liquid waste from 16 gallons per month to zero. Because used thinner is continually added to the recycled thinner, this process can hypothetically go on indefinitely without having to purchase new thinner. This has not been tested at our shop yet due to the fact we have only been using this system for three months. We have seen significant reductions in our thinner purchases, as we were buying 16 gallons of thinner every 6 weeks at a cost of $182. Since the purchase of the Recyclit we now recycle 20 gallons of thinner every 6 weeks and our only cost is the sludge bags which are $5 each for every 5 gallons of thinner recycled. This system was paid for by the base's environmental flight at no cost to us. The savings to the Air Force is significant in terms of hard currency and in environmental areas. It previously cost $510 to dispose of one 16 gallon barrel of used paint thinner, whereas now, it costs nothing. The savings to the environment can not be measured in dollars. Since we no longer dispose of this type of waste, contamination/pollution problems are virtually eliminated.

Although we are proud of the improvements made to the Allied Trades Element, we realize that success is judged not only by the here and now, but also by our plan for the future. As stated earlier, our facility is severely limiting and has not met OSHA or Air Force standards for a number of years. After over 20 years of working in an inadequate facility, we have undertaken a major renovation project. With this project we will be completely renovating an existing building which is much larger and several years newer. In this new facility, we will be installing an Accudraft 2000 paint booth. Along with our new paint booth, we will be installing a ventilated paint mixing room, that will further reduce workers exposure to harmful vapors. These future plans also include the installation of Accudraft Prep Stations, these are currently in the research stage. Our current system for painting vehicles entails prep work in our body shop, painting is then done a quarter mile away in an undersized, poorly lit, inadequately ventilated, cinder block room which is now serving as our "paint booth." Some problems associated with this process include additional man hours transferring vehicles between buildings, more time to re-wash vehicles after the transfer, hazardous working conditions due to poor lighting and improper ventilation. While these problems are all significant, there is another problem that is just as pressing. That problem is the release of paint particulates into the environment. Our current filtration system is highly inadequate and allows paint over-spray to escape through the ventilation system. This is evidenced by the buildup of paint on the outside of the building under the ventilation ducts. With the completion of renovations our body shop will be self contained in its own building, all aspects of shop work can then be accomplished in one area to include painting and prep. With our new facility, we will be installing the Accudraft 2000 paint booth which will enormously reduce harmful outputs to the environment and limit exposure to the workers. This booth is large enough to handle 95% of our vehicle fleet. This alone will reduce contract costs. Currently, any vehicle larger than a crew cab pickup truck has to be sent downtown or to F. E. Warren AFB to be painted. The Accudraft system contains a duel exhaust filtration mode. With this improvement, it will trap more paint particulates preventing release into the environment. It also has an improved bake cycle which utilizes up to 80% re-circulated hot air. This is a more efficient system for a booth of this size. It utilizes 1.55 million BTUs/hr whereas the average system of this size will require 3 million BTUs/hr.

Not only does this system reduce the harmful releases into the environment, but it is also more energy efficient. With its unique exhaust system which utilizes four fans, each moving 11,000 CFM(cubic feet per minute), it will eliminate "dead spots" thus greatly reducing the chances for flash fires, and dull paint finishes due to trapped solvent.

Though Air Force body shops are unique due to the nature of our mission, we have shown through positive action that our shops can be comparable to civilian body shops. The improvements we have made will let us stay in step with the changing technology of today's automotive collision industry, while giving the government the highest quality product for its dollar. All of this can be done while still putting our environmental concerns and workers' health in the highest priority. So, in these days of lead, follow, or get out of the way, we at the 341 Transportation Squadron have decided to lead, let everyone else follow.